Quality of generalist vs. specialty care for people with HIV on antiretroviral treatment: a prospective cohort study

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Abstract: OBJECTIVES: To describe health-care use by persons with HIV in an urban area of Switzerland (Zurich). Further, to compare the different health-care settings. DESIGN: A 1-year prospective cohort study recruiting 60 patients at general practices and 60 patients at a specialized university outpatient clinic. METHODS: Patients and their treating physicians were interviewed or answered questionnaires, respectively, at baseline, month 6 and 12. RESULTS: During the study period, five patient groups were identified among the 106 enrolled patients, of whom (i) 42% saw a general practitioner exclusively, (ii) 31% were treated at the specialized outpatient clinic, (iii) 8% were in shared care, (iv) 10% changed health-care model, and (v) 9% were lost to follow-up. Baseline demographic, psychosocial and clinical data were similar among patient groups. At study end, the proportion of patients with HIV-1 RNA < 400 copies/mL was 72%, 74%, 88%, 55% among groups (i) to (iv), respectively (ns), and 22% at month 6 among those lost to follow-up. Indicators for quality of care were similarly good among all patient groups. CONCLUSIONS: A well-working system offers high-quality healthcare to persons living with HIV, where existing teams of specialty and primary health-care professionals efficiently and effectively co-operate.

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ORIGINAL RESEARCH

Quality of generalist vs. speciality care for people with HIV on antiretroviral treatment: a prospective cohort study

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Objectives

To describe health-care use by persons with HIV in an urban area of Switzerland (Zurich). Further, to compare the different health-care settings.

Design

A 1-year prospective cohort study recruiting 60 patients at general practices and 60 patients at a specialized university outpatient clinic.

Methods

Patients and their treating physicians were interviewed or answered questionnaires, respectively, at baseline, month 6 and 12.

Results

During the study period, five patient groups were identified among the 106 enrolled patients, of whom (i) 42% saw a general practitioner exclusively, (ii) 31% were treated at the specialized outpatient clinic, (iii) 8% were in shared care, (iv) 10% changed health-care model, and (v) 9% were lost to follow-up. Baseline demographic, psychosocial and clinical data were similar among patient groups. At study end, the proportion of patients with HIV-1 RNA $<$ 400 copies/mL was 72%, 74%, 88%, 55% among groups (i) to (iv), respectively (ns), and 22% at month 6 among those lost to follow-up. Indicators for quality of care were similarly good among all patient groups.

Conclusions

A well-working system offers high-quality healthcare to persons living with HIV, where existing teams of speciality and primary health-care professionals efficiently and effectively co-operate.

Keywords: combination antiretroviral therapy, generalists, HIV, quality of care, specialists

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Introduction

In the epidemic's first decade, care for people with HIV or AIDS was provided to a large extent by general practitioners. The introduction of highly active antiretroviral therapy re-opened the discussion on the qualifications and expertise needed for high-quality care. There was growing support for the argument that multidrug antiretroviral regimens were so complex that generalists in primary care would have difficulties in maintaining sufficient expertise in this area [1, 2]. Recent studies, however, have shown that primary care physicians, with a certain level of experience and commitment to ongoing HIV education, can deliver high-quality care [3–8].

Possible advantages of being treated by primary care physicians have been elaborated. As HIV infection is a chronic, not curable and potentially life-threatening illness, management requires extensive education, counselling and emotional support of affected individuals and other persons to whom they relate. Apart from these skills that may better be met by primary care medicine, other characteristics, that do not only apply

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to individual physicians, but rather to the system they work in, may be important determinants of patient outcome [1–3]. Such characteristics include accessibility, continuity, co-ordination and comprehensiveness of services [9]. A model has been suggested where primary care by a generalist is conjoined with consultation from and co-operation with a specialist so as to combine the advantages of primary care with expertise on the rapid developments in HIV medicine [3, 10, 11]. In several other chronic illnesses – such as asthma and diabetes – this has been shown to be a fruitful relationship [12–14].

We investigated healthcare for people with HIV in the urban area of Zurich, Switzerland, where health insurance covers the whole population and guarantees free choice of physicians. HIV-specific care is provided by specialists at a university-based HIV outpatient clinic as well as by general practitioners. Our objectives were (i) to describe the different healthcare use by patients. Further, to compare the different healthcare settings with regard to (ii) patient's characteristics; (iii) the quality of care with regard to several indicators (treatment outcome, prescribed therapy, adherence, quality of life and patients' satisfaction with care setting); (iv) the patients' evaluation of different health service dimensions (interaction of providers with patients, non-personal qualities of care setting) and (v) physicians' characteristics.

Participants and methods

Study design

We conducted a prospective cohort study of people with HIV who were enrolled by six physicians (fellows) at the specialized university HIV outpatient clinic and by 10 general practitioners in the urban area of Zurich, Switzerland. Data on patients were collected at baseline, month 6 and 12. Clinical data were reported by the treating physician using standardized questionnaires; all other patients' data were collected by trained interviewers using standardized and semi-standardized questionnaires. The physicians answered a questionnaire on physicians' characteristics at baseline.

Institutions and physicians

The fellows were in a 1-year rotating position at the Division of Infectious Diseases and Hospital Epidemiology at the University Hospital, and mostly in postgraduate training to become a specialist in internal medicine, infectious diseases or general practice. Experienced staff physicians specialized in infectious diseases closely supervises them in their work. The practitioners, mostly specialists in general or internal medicine, were recruited within a group of physicians, named 'HIV-Pract'. These physicians all actively treat patients with HIV and HIV-Pract has been organizing monthly meetings for teaching and network purposes since 1993.

Patient selection

We aimed at enrolling 120 participants, 60 at the HIV outpatient clinic and 60 in general practices, assigning a predefined number of a maximum of 10 patients to each physician. Between January and August 1999, patients who met the inclusion criteria were consecutively asked for participation when they were attending their physicians, the criteria being: (1) an individual with HIV on antiretroviral therapy; (2) patient having had at least three prior consultations with the same physician; and (3) the patient being willing to give written informed consent.

Measures

Patients' characteristics

Demographic characteristics, psychosocial measures and clinical data were assessed. Depressive symptoms were assessed using Beck Depression Inventary (scale range 0–63, higher scores meaning more depressed mood) [15]. Sense of Coherence was used for personality measurement (scale range: 13–65, higher scores indicating higher sense of coherence) [16]. On a visual analogue scale with a range from 0 to 100 the patients indicated their current physical wellbeing (0, very bad; 100, very good). Patients' history, clinical data including HIV-disease stage, comorbidity, detailed medication and side effects were documented. Plasma HIV-1 RNA concentration was determined by the Amplicor HIV-1 Monitor (Roche Diagnostics, Basle, Switzerland) with a limit of detection of 400 copies/mL, in some patients using the ultrasensitive assay (limit of detection <50 copies/mL).

Course of HIV infection

Course of CD4 lymphocyte counts, HIV-1 RNA levels and antiretroviral therapy were documented prospectively over 1 year.

The use of healthcare

The use of healthcare was documented at each time point according to the question: 'What healthcare model are you currently in – exclusively seeing a general practitioner, exclusively attending the outpatient clinic or being in shared care (i.e. simultaneously seeing a specialist and a general practitioner)?

Evaluation of antiretroviral therapy

One infectious diseases specialist (RW) and one general practitioner (RJ) rated the therapy of the individual patients as (i) successful, (ii) not successful but plausible, (iii) not successful and not plausible, and (iv) no judgement possible according to graphs on the course of HIV surrogate markers during the study and treatment history. Access to the original patient chart was not possible and the experts did not interview or examine the patients. Treatment was considered *successful* if: (i) CD4 cell counts were rising or stable during the 1-year follow-up and were above 200 cells/μL, irrespective of viral load, or (ii) if viral load decreased to, or was below, the level of detection during the 1-year period, irrespective of CD4 cell counts, or (iii) if unsuccessful antiretroviral therapy leading to virologic failure was changed during the follow-up to a salvage regimen containing at least two new drugs, if available. Treatment was considered *plausible* (but not successful) if the criteria mentioned above were not met, but clinically acceptable reasons not to change antiretroviral drugs were evident (e.g. no potentially better treatment regimen was at hand, based upon patient's treatment history; or comorbidity, psychosocial variables and drug use). Whereas resistance testing in the case of virologic failure, as well as assessments of drug levels became the standard of care at the study institutions, these methods were neither available nor reimbursed by health insurance companies at the time period when the study was performed, i.e. between 1999 and 2001.

Adherence to antiretroviral therapy

The patients were asked by the interviewer using visual analogue scales ranging from 0 to 100% to estimate the proportion of drugs they had taken: (i) at the correct time and (ii) in the correct amount the day before the interview; the average of these two measures was taken as a proxy for adherence.

Quality of life

We used the FAHI (Functional Assessment of Human Immunodeficience Virus Infection), a questionnaire consisting of 44 items (scale range: 0–176; higher scores indicating higher quality of life) [17, 18].

Patients' satisfaction. evaluation of health service dimensions

Prior to this study, focus group discussions were conducted to assess dimensions important for the care of people with HIV [19, 20]. On the basis of these results we developed structured questions concerning: (i) the overall satisfaction of each patient with his/her healthcare model; (ii) the satisfaction with aspects related to the treating physician (competence, continuity, course of a visit); and (iii) the evaluation of different health-care dimensions (interaction of providers with patients, non-personal qualities of care setting). The satisfaction scales ranged from 1 (not satisfied) to 5 (very satisfied), the scales concerning dimensions of health-care provision from 1 (is not at all true) to 5 (is very true).

Physicians' characteristics

A questionnaire on demographic data and physicians' experience with care of persons living with HIV was used.

Statistics

To assess differences in the patients' and physicians' characteristics, we conducted cross-sectional comparative analyses for baseline data. Further, we compared different patient groups cross-sectionally at all three time points: (i) three groups of patients, who stayed in the same health-care model during the study period; (ii) patients who stayed in a stable health-care model during the study period vs. patients who changed model during the observed time; (iii) patients, who withdrew from the study vs. patients, who stayed enrolled during the whole study (including patients who died during the study).

Categorical data were subjected to Pearson's χ^2 or Fisher's exact test. To compare continuous data an analysis of variance (post hoc comparison Scheffé test, $P<0.05$) and for the comparison of two groups Student's *t*-test for independent samples were used. If the data were skewed, non-parametric tests (Kruskal–Wallis variance analysis or Wilcoxon Mann–Whitney *U*-test) were used. All analyses were performed using SPSS 6.1 for Macintosh (SPSS Inc., Chicago, IL, USA).

Results

Participation of patients

Out of 200 patients asked for enrolment, a total of 120 patients gave written consent and 106 patients were questioned at baseline. There were no significant differences in age or sex between individuals who were enrolled and those who rejected to participate. During the study, nine patients were lost to follow-up and two patients died (Fig. 1).

Patient groups identified during study period

Among the 106 patients who were enrolled either at the HIV outpatient clinic or by general practitioners, five patient groups were identified: (1) A total of 45 (42.5%) patients exclusively saw their general practitioner; (2) 33 (31.1%) exclusively attended the specialized clinic; (3) eight (7.5%)

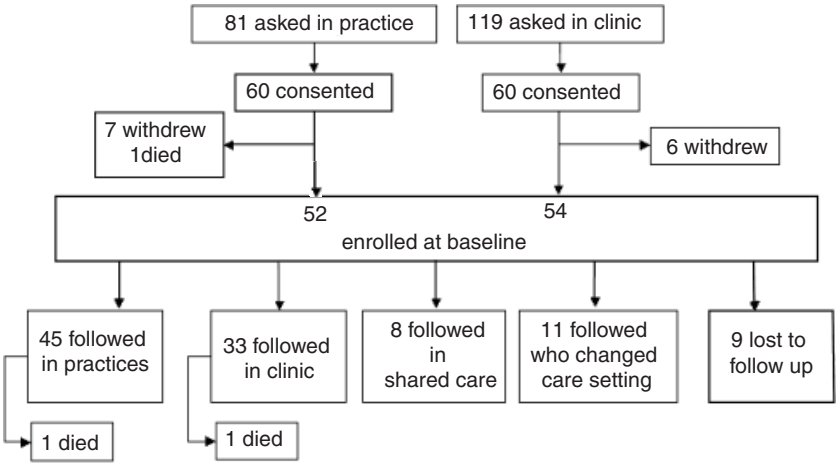

Fig. 1 Study profile. Numbers indicate numbers of patients.

were in shared care seeing a specialist at the clinic as well as a general practitioner; (4) 11 (10.4%) changed their care setting during the course of the study; and (5) nine patients (8.5%) were lost to follow-up. Out of those 11 patients who changed their health-care model during follow-up, a majority was in shared care at baseline (Fig. 1).

Patients' characteristics at baseline

Of the 106 patients 83 were male (78.3%), 57 (53.8%) lived in the town of Zurich, 35 (33%) had a high school or higher education, 10 (9.7%) obtained welfare, 54 (55.1%) were homosexual and 42 (39.6%) had a history of substance use. Their mean age was 39.9 ($\pm$ 7.5) years and their mean income per month was SFr. 4317.30 ($\pm$ 7.5) (i.e. 2854.04 US$). The median CD4 count among all study participants was 352 cells/μL (range: 29–1390), median HIV-1 RNA 36 copies/mL (0–233 196). Median nadir CD4 count was 132.5 cells/μL, ranging from 0 to 760 cells/μL. Previous AIDS was documented in 27.9% of the participants. We found low mean ($\pm$SD) scores using Beck Depression Inventory (i.e. few depressive symptoms) (8.9 ± 6.9), high mean scores regarding sense of coherence (48.8 ± 7.6), and high mean scores with respect to physical wellbeing (78.1 ± 17.4).

No statistically significant differences were found between the three groups of patients, who stayed in the same healthcare model during the study period (i.e. general practice, outpatient clinic, shared care) (Table 1).

A comparison of the 11 participants who changed the health-care model during follow-up and the 86 individuals who remained in the same care model revealed no statistically significant differences (Table 1).

Clinical course of HIV infection

CD4 lymphocyte counts and the proportion of individuals with HIV-1 RNA concentrations below 400 copies/mL among the different patient groups are depicted in Fig. 2. A total of four patients developed a new AIDS-defining disease and two patients died during the study.

At study end the median CD4 cell count (range) in the three stable patient groups was 459 cells/μL (120–1442 cells/μL) for the general practice group, 449 cells/μL (79–891 cells/μL) for the clinic group, and 303.5 cells/μL (104–751 cells/μL) for patients in shared care (ns). The proportion of participants with viral load below 400 copies/mL at study end was 72.1% among patients attending general practices, 74.2% among patients at the clinic, and 87.5% among patients in shared care (ns). The proportion rose during the year in all patient groups especially in the patients in shared care.

Compared to the patients in a stable health-care model ($n = 86$) a lower proportion of the 11 patients who changed their model during the study had HIV-1 RNA concentrations below 400 copies/mL (baseline: 60% vs. 69%; study end: 54.5% vs. 74.4%).

Antiretroviral therapy

Standard-of-care antiretroviral therapy was provided to most patients according to the rating of the experts. The majority of the whole sample was on a triple combination at baseline (81.6%). Mean ($\pm$ SD) time of being on any antiretroviral treatment was 2.9 years before study entry ($\pm$ 2.0); mean time of being on at least triple antiretroviral treatment was 2.0 years ($\pm$ 0.9). During the study, nine

Table 1 Characteristics of patient groups at baseline[1]

	General practice	Speciality outpatient clinic	Shared care	Change of care model	Lost to follow-up
No. of patients	45	33	8	11	9
Self-reported information					
No. male (%)	33 (73.3)	30 (90.9)	5 (62.5)	10 (90.9)	5 (55.6)
Mean age (± SD)	39.6 (±8.1)	39.4 (±7.2)	43.0 (± 8.1)	42.1 (± 7.3)	38.4 (± 5.5)
Place of residence, no. (%)					
City of Zurich	34 (75.6)	14 (42.4)	2 (25)	4 (36.4)	3 (33.3)
District of Zurich	9 (20)	10 (30.3)	2 (25)	5 (45.5)	4 (44.4)
other	2 (4.4)	9 (27.3)	4 (50)	2 (18.2)	2 (22.2)
High school or higher education, no. (%)	17 (37.8)	10 (30.3)	2 (25)	3 (27.3)	3 (33.3)
Mean monthly income (± SD), SFr.	4 193 (±1 965)	4 529 (± 2 165)	3 587 (± 1 657)	4 800 (± 3 194)	4 266.7 (± 3 255)
No. obtaining welfare (%)	3 (6.7)	2 (6.1)	2 (25)	1 (9.1)	2 (25.0)
Sexual orientation, no. (%)					
heterosexual	14 (34.1)	13 (40.6)	5 (71.4)	2 (18.2)	3 (42.9)
homosexual	25 (61.0)	18 (56.3)	1 (14.3)	6 (54.5)	4 (57.2)
bisexual	2 (4.9)	1 (3.1)	1 (14.3)	3 (27.3)	0
No. with history of substance use (%)[2]	17 (37.8)	11 (33.3)	4 (50)	4 (36.4)	6 (66.7)
Mean quality of life (± SD)[3]	130.5 (±23.6)	130.8 (± 21.7)	126.9 (± 26.1)	126.9 (± 22.9)	125.5 (± 19.9)
Mean patient satisfaction (± SD)[4]	4.8 (±0.4)[5]	4.4 (± 0.7)[5]	5 (± 0)[5]	3.7 (± 1.1)[6]	4.3 (± 1.3)
Psychosocial measures, mean (± SD)					
depression[7]	8.1 (±6.4)	8.1 (± 6.4)	10.9 (± 7.4)	9.0 (± 6.0)	13.8 (10.2)
sense of coherence[8]	48.8 (±8.6)	50 (± 6.6)	46.5 (± 6.2)	48.3 (± 7.6)	46.8 (± 7.0)
physical wellbeing[9]	77.4 (±16)	83.3 (± 13.3)	72.3 (± 16.3)	69.5 (± 24.7)	77.8 (± 24.5)
Mean adherence to therapy,% (± SD)	94.2 (±14.8)	95.7 (± 7.6)	98.7 (± 2.3)	97.7 (± 5.2)	78.9 (± 34.3)
Mean no. of visits during last 6 months (± SD)	8.0 (±7.2)[10]	5.7 (± 5.0)[10]	12.6(± 8.7)[10]	11.3 (± 8.9)[11]	4.8 (± 3.0)
Information from treating physicians					
Median nadir of CD4 count ever (range)	136 (0–760)	130 (0–445)	36.5 (11–288)	90 (1–645)	182 (18–730)
Median baseline CD4 count (range)	385 (31–1 309)	363 (29–897)	292.5 (30–545)	298 (84–1 023)	335 (66–1 390)
Median peak viral load (range)	120 939 (232–2 368 602)	82 753 (1 271–895 382)	94 820 (2 350–676 829)	289 300 (31 566–826 800)	131 707 (8 990–747 068)
Median baseline viral load (range)	40 (0–232 003)	10 (0–124 556)	2.5 (0–21 302)	229 (0–35 232)	253 (1–233 196)
Viral load <400 cop/mL, no. (%)	30 (69.8)	23 (69.7)	5 (62.5)	6 (60)	5 (55.6)
Previous AIDS, no. (%)	13 (29.5)	9 (27.3)	2 (25)	4 (40)	1 (11.1)
Antiretroviral therapy, no. (%)					
double	2 (4.4)	3 (9.1)	1 (12.5)	1 (9.1)	0
triple	42 (93.3)	24 (72.7)	6 (75)	8 (72.7)	6 (66.7)
quadruple or more	1 (2.2)	6 (18.2)	1 (12.5)	2 (18.2)	3 (33.3)
Mean time on any antiretroviral treatment, years (± SD)	2.8 (± 2.3)	3.0 (± 1.8)	2.8 (± 1.2)	3.3 (3.3)	2.9 (± 2.0)
Mean time on at least triple antiretroviral treatment, years (± SD)	1.8 (± 0.9)	2.2 (± 0.8)	2.2 (± 0.9)	2.1 (± 1.0)	2.0 (± 0.9)

[1]No statistically significant differences except where especially indicated with a footnote [2]Self-reported history of or current substance use of at least one of the following: Heroin, methadone, cocaine [3]range 0–176, with higher scores indicating higher quality of life [4]range: 1 (not satisfied) to 5 (very satisfied) [5]Patients at general practices and in shared care were statistically significantly more satisfied than patients at the outpatient clinic-group were ($P<0.05$). [6]Patients who changed setting during the course of the study were statistically significantly less satisfied with their setting than the patients with stable treatment situation were ($P<0.05$). [7]range 0–63, with higher scores indicating more depressed mood [8]range 13–65, with higher scores indicating higher sense of coherence [9]range 0–100, with higher scores indicating better wellbeing [10]Patients in shared care had statistically significantly more visits than patients seeing specialists did ($P<0.5$). [11]Patients who changed setting during the course of the study saw their physicians statistically significantly more often than the patients with stable care model did ($P<0.05$).

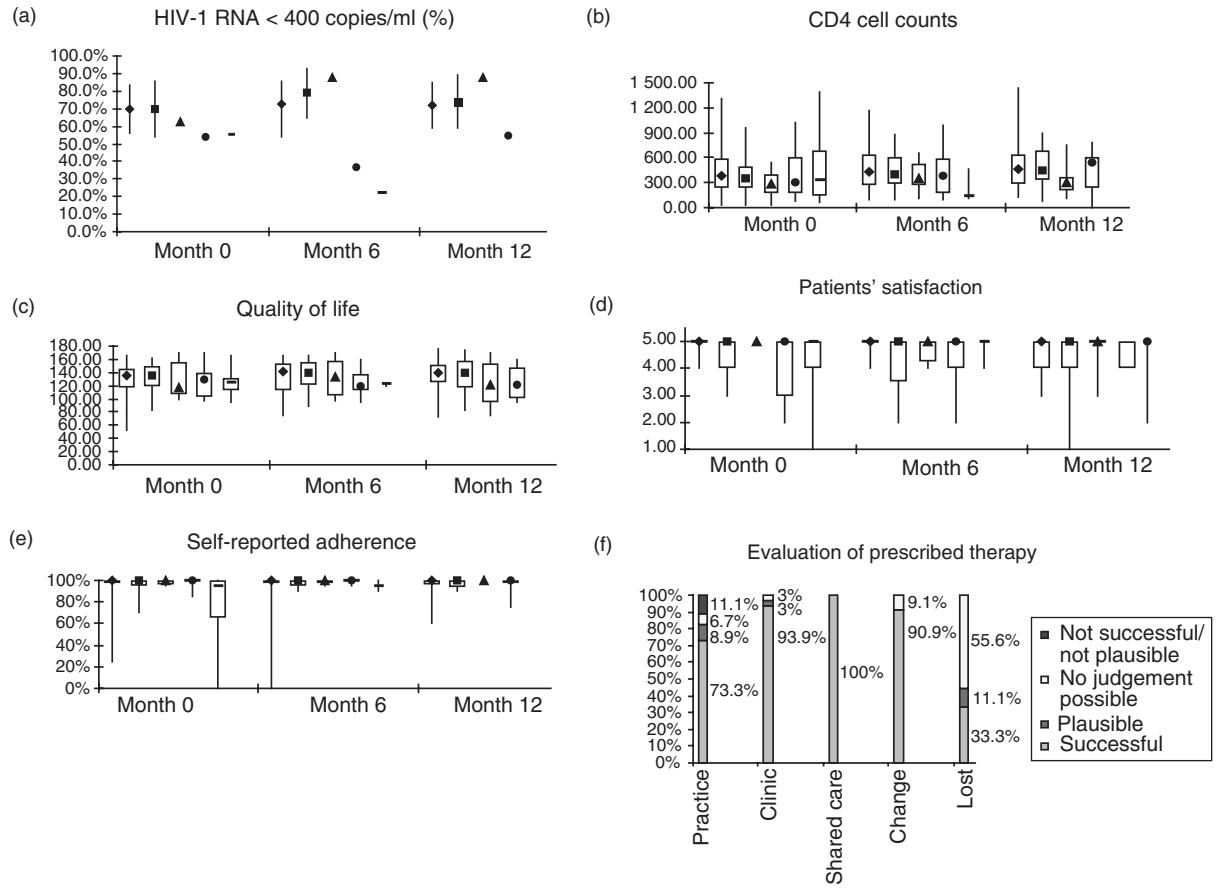

Fig. 2 Comparison of indicators for quality of care during 1-year follow-up among five different patient groups: (1) ◆ Care by a general practitioner exclusively ($n = 45$); (2) ■ Care at a specialized university outpatient clinic exclusively ($n = 33$); (3) ▲ Patients in shared care ($n = 8$); (4) ● Patients who changed from one care model to an other ($n = 11$); and (5) – Patients who were lost to follow-up (month 0: $n = 9$; month 6: $n = 3$). Panel (a): Proportion of individuals with HIV-1 RNA values less than 400 copies/mL during follow-up (95% CI where reasonable). Panel (b): Course of CD4 cell counts. Panel (c): Course of quality of life. Panel (d): Course of patients' satisfaction with care. Panel (e): Course of adherence. Panel (f): Evaluation of prescribed antiretroviral therapy.

patients stopped antiretroviral therapy, of whom two restarted. Cessation of treatment was equally distributed between patients at the clinic and in general practices.

No statistically significant differences were found between groups treated at the specialized clinic, general practices or by both institutions (Fig. 2, Table 1).

Adherence to therapy

Self-reported mean adherence to therapy at baseline was around 95% and similar among the different patient groups, who stayed in the same health-care model with the patient group in shared care indicating the highest rates (Table 1). At study end the mean (± SD) rate of adherence was 96.6% (±7.8) among those in general practice, 96.8% (±4.1) among patients at the specialized HIV clinic, 100% (±0) among those in shared care, and 96.7% (±8.3) among patients who changed care model during the study. No statistically significant differences were calculated in any group comparison (Fig. 2).

Quality of life

Mean quality of life of all study participants was 129.5 (± 22.5) at baseline and 131.6 (± 25.6) at study end.

Those patients who remained in a stable health-care model obtained high mean scores of quality of life with no statistically significant differences between the three groups at any time point (Table 1, not all data shown). Quality of life changed during the study period among

patients who were in shared care (scores at study end – general practice: 133.5 ± 25.1; outpatient clinic: 134 ± 25.5; shared care: 122.3 ± 33.1) (Fig. 2).

In comparison to the patients who changed health-care model, the patients in a stable treatment situation had higher quality of life scores (baseline: 126.9 ± 22.9 vs. 130.3 ± 22.9). At study end mean quality of life was 124.0 (± 22.1) and 132.6 (± 26), respectively.

Patients' satisfaction

Mean overall patient satisfaction was high in all patients during the whole course of the study (baseline: 4.6, ± 0.8; study end: 4.5 ± 0.8). Statistically significant differences were calculated for baseline data only (Table 1, Fig. 2).

With regard to the more specific questions on patient satisfaction the general practitioners obtained higher mean scores for all dimensions, whereby the differences in physicians' competence and personal continuity were statistically significant (Table 2). As the patients in shared care answered each item twice (relating to outpatient clinic and general practice) they were excluded from this specific subanalysis. This exclusion entailed that the comparison between the stable patients and the patients who changed health-care model during the study was not possible either.

Patients' evaluation of different health-care dimensions

Each patient rated different aspects of health-care dimensions of her/his treatment setting. As explained above the patients in shared care and the ones who changed health-care model were excluded from this analysis. The scores of the two settings 'general practice' and 'outpatient clinic' were very good at baseline and at follow-up visits, but the

Table 2 Patients' view of their own healthcare model[1]

	Month 0			Month 12		
	General practice	Speciality outpatient clinic	*P*	General practice	Speciality outpatient clinic	*P*
No. of patients	45	33		45	33	
Patient satisfaction with…						
… physician's competence[2]	4.9 ± 0.03	4.3 ± 0.8	<0.001	4.8 ± 0.4	4.1 ± 1.0	<0.01
… course of a visit[2]	4.6 ± 0.7	4.2 ± 1.0	n.s.	4.5 ± 0.7	4.3 ± 1.0	n.s.
… personal continuity[2]	4.7 ± 0.6	3.7 ± 1.2	<0.001	4.8 ± 0.5	3.3 ± 1.2	<0.001
My physician gives me enough information[3]	4.6 ± 0.5	4.2 ± 0.7	<0.05	4.5 ± 0.6	3.8 ± 0.9	<0.001
I express myself clearly about my state of health[3]	4.3 ± 0.8	4.1 ± 1.0	n.s.	4.3 ± 0.7	4.0 ± 0.8	n.s.
My physician communicates comprehensibly[3]	4.6 ± 0.5	4.2 ± 0.8	<0.01	4.5 ± 0.6	3.8 ± 0.8	<0.001
It is easy to start talking with my physician and her/his staff[3]	4.5 ± 0.7	4.1 ± 0.9	<0.05	4.4 ± 0.8	3.8 ± 1.2	<0.05
My physician perceives me as a whole person[3]	4.6 ± 0.7	4.1 ± 0.8	<0.01	4.5 ± 0.6	3.8 ± 1.0	<0.01
My physician always asks for my opinion[3]	4.4 ± 0.7	3.5 ± 0.9	<0.001	4.5 ± 0.7	3.5 ± 1.0	<0.001
I have a say in important decisions regarding my treatment[3]	4.6 ± 0.6	4.3 ± 0.7	n.s.	4.6 ± 0.7	4.0 ± 1.0	<0.01
My physician trusts me and my statements on my health[3]	4.4 ± 0.6	4.1 ± 0.8	n.s.	4.5 ± 0.6	3.7 ± 1.0	<0.001
I am honest to my physician[3]	4.7 ± 0.6	4.5 ± 0.6	n.s.	4.5 ± 0.7	4.3 ± 0.7	n.s.
I feel I am in good hands with my physician[3]	4.7 ± 0. 4	4.1 ± 0.9	<0.001	4.6 ± 0.5	3.8 ± 1.1	<0.001
I adhere to my physician's recommendations[3]	4.3 ± 0.7	4.1 ± 0.7	n.s.	4.2 ± 0.7	4.1 ± 0.7	n.s.
My physician wants the best for me[3]	4.7 ± 0.6	4.1 ± 0.6	<0.001	4.5 ± 0.5	4.0 ± 0.9	<0.001
My physician seems to be content with my condition[3]	4.2 ± 0.7	4 ± 0.8	n.s.	4.2 ± 0.9	4.1 ± 0.9	n.s.
I feel friendly towards my physician[3]	4.6 ± 0.6	4.1 ± 0.8	<0.01	4.5 ± 0.6	3.7 ± 1.1	<0.01
I am not inhibited to speak about intimate matters[3]	4.4 ± 1.1	4.3 ± 1.0	n.s.	4.3 ± 0.9	4.1 ± 0.9	n.s.
My physician is not inhibited to speak about intimate matters[3]	4.6 ± 0.5	4.4 ± 1.0	n.s.	4.6 ± 0.6	4.1 ± 1.0	<0.01
My physician asks about my psychosocial wellbeing[3]	3.5 ± 1.1	2.7 ± 1.1	<0.01	3.6 ± 1.0	2.3 ± 0.9	<0.001
The practice/clinic is at a convenient place for me[3]	3.8 ± 1.1	3.7 ± 1.3	n.s.	3.7 ± 1.1	3.7 ± 1.3	n.s.
I am confident that anonymity is guaranteed[3]	4.0 ± 1.3	3.6 ± 1.6	n.s.	4.6 ± 0.9	3.8 ± 1.3	<0.01
I do not have any problems to co-ordinate appointments with physician with other appointments[3]	4.4 ± 0.9	4.2 ± 1.3	n.s.	4.5 ± 0.8	4.3 ± 1.0	n.s.
The surgery/clinic is well equipped[3]	4.4 ± 0.8	4.4 ± 0.8	n.s.	4.4 ± 0.9	4.5 ± 0.8	n.s.
My physician can be contacted outside regular times[3]	4.4 ± 0.8	3.5 ± 1.3	<0.01	4.3 ± 1.0	3.6 ± 1.2	<0.01
The surgery/clinic has an agreeable atmosphere[3]	4.3 ± 0.7	3.2 ± 1.2	<0.001	4.2 ± 0.9	3.0 ± 1.0	<0.001
I do not have to wait long[3]	4.0 ± 1.0	4.2 ± 1.1	n.s.	4.0 ± 1.0	4.4 ± 0.9	n.s.

[1]Mean (± SD). [2]Scale range 1 'not satisfied' to 5 'very satisfied'. [3]Scale range 1 'not true at all' to 5 'very true'.

general practitioners received significantly higher mean scores for many items at all study visits (Table 2).

Physicians' characteristics

The physicians at the specialized outpatient clinic were younger compared to their colleagues in general practice, had less clinical experience since graduation, but had seen more persons with HIV during the previous 12 months (Table 3).

All of the general practitioners reported having cared for at least five (range: 5–70) patients with HIV within the previous 12 months, six of the 10 general physicians having cared for more than 20 patients.

Discussion

We aimed at comparing two health-care settings for people with HIV in an urban area of Switzerland: the specialized university HIV outpatient clinic and general practices. However, we observed five patient groups during the study period, patients who: saw a general practitioner exclusively; attended the specialized clinic only; were in shared care (although enrolled either at the outpatient clinic or at a general practice); changed healthcare model; or were lost to follow-up.

At enrolment, the groups of participants were similar with respect to demographic, psychosocial and clinical data. With regard to the evaluated indicators for quality of care we found similarly good results in the different patient groups: average quality of life and self reported adherence was high. Also, patients' overall satisfaction with care was very good but higher among those attending general practices or being in shared care. During follow-up, the differences diminished. Antiretroviral therapy was mostly provided according to the state-of-the-art. Treatment outcome as assessed by comparing the proportion of patients with HIV-1 RNA concentrations below 400 copies/mL was similar among patients in stable health-care models, but indicated a higher rate of treatment failure among patients who were lost to follow-up and among the group who changed treatment setting during the study. All participating physicians were involved in continuing education; the general practitioners had collected experience over the past in HIV-medicine and are continuing to do so.

The strength of this observational study is that its prospective design with follow-up of different patient groups over 1 year allowed us to compare the patients' views on their health-care setting, their quality of life, satisfaction, and adherence to the institution, as well as to the therapy, with their treatment outcome. Such aspects of community-based care cannot be approached with a randomized trial or a cohort study from specialized HIV centres. Many experts doubt that outcome results obtained in randomized trials, enrolling highly motivated and possibly selected patients who are followed in special care settings, are comprehensive. Our cohort of patients may be more representative of the community of people with HIV, also including patients with a drug use history, than a study population enrolled in clinical trials.

However, this study design has its limitations because the patients selected the care setting by themselves, and, although the demographic and clinical data of patient

Table 3 Physicians' characteristics

	General practitioners	Specialists at outpatient clinic	P
No. of physicians	10	6	n.a.
No. male (%)	8 (80)	3 (50)	n.s.
Mean age (± SD)	47.1 (± 9.2)	36.8 (±4.4)	< 0.05
Mean years in practice or at clinic (± SD)	10.9 (± 8.9)	1.0 (± 1.5)	< 0.05
No. general practitioners who have ever worked at a HIV-specialized institution	1	n.a.	n.a.
Mean no. years since 1st treatment of HIV-patient (± SD)	10.6 (± 4.5)	5.5 (± 3.4)	< 0.05
Mean no. years since treating patients with HIV in own practice (± SD)	8.5 ± 4.6	n.a.	n.a.
Mean no. of treated persons with HIV in last 12 months (± SD)[1]	28.4 (±21.5)	177.3 (± 119)	
Mean estimated proportion of all patients who are HIV-infected attending institution (± SD)	15.75 (± 23.4)	n.a.	n.a.
Mean years since final university examination (± SD)	19.7 (±8.2)	10 (± 4.4)	< 0.05
No. with specialist's training (%)	7 (70)	5 (83.3)	n.s.
No. of physicians spending more than 1/3 of a consultation discussing psycho-social problems (%)	8 (80)	2 (33.3)	n.s.
Mean working time spent with people with HIV per week, hours (± SD)	12.5 (± 10.9)	53.2 (± 4.2)	<0.001

[1]range for general practitioners: 5–70; range for specialists: 40–250. Only three residents had been at the clinic for longer than 12 months. The others had only been in this department for between 2 weeks and 6 months. This comparison was not made as it makes no sense.

groups appeared similar, we cannot rule out that we compared different patient groups. Furthermore, dedication and HIV-specific knowledge of the 10 participating practitioners cannot be generalized to other general practitioners. The participating physicians invest a lot of time and effort in continuing education, have collected enough experience in HIV-medicine to keep a high level of competence and co-operate with the specialists at the clinic. The results of virologic and immunologic outcome need to be interpreted with caution because this was not a controlled trial. Nevertheless, considering that a substantial number of patients had a long treatment history, that almost 30% of them had previously suffered from an AIDS-defining illness and that the median nadir CD4 lymphocyte count was below 200/μL, virologic and immunologic treatment outcome was favourable with HIV-1 RNA below 400 copies/mL in 70% of all patients at month 12. These results are comparable to those of randomized trials.

Our study shows that people with HIV can be treated by highly motivated general practitioners with specialist knowledge. Patients who select this care setting are more satisfied with it, although patients' satisfaction was also excellent at the large specialized institution with a rotating system of physicians.

As it is frequently observed that patients rate their satisfaction with care highly when asked in a global way, more specific questions on patient satisfaction were asked [21–25]. These results revealed that the patients seeing general practitioners were more satisfied with the physician's competence and the personal continuity provided. Possibly the physician's competence was interpreted in a broad way including patients' view on communication skills besides specialists' medical knowledge. The study physicians at the clinic on the other hand were mainly 'junior' physicians who work in a highly controlled environment. Skilled senior staff physicians are available to review the care on a regular basis, and critical decisions, such as initiation or change of antiretroviral therapy, are discussed before any action is taken. This may give the patients the impression of relative incompetence of their directly treating physician, although the 'system' is highly specialized.

With regard to the evaluation of different health service dimensions, the general practices received higher rates concerning the interaction of providers with patients and accessibility/convenience factors of the setting. One needs to keep in mind, though, that while these differences may reflect different features of the settings they do not say anything about the importance of these aspects for the individual patient. It may be that some patients do not want to talk with their physician about the psychosocial aspects of their life with HIV and, therefore, choose to see a specialist at the clinic who concentrates more on the disease management [26].

A finding not considered when we designed the study was that there is a group of patients who changed health-care model. Possible reasons for the changes may be dissatisfaction with their health-care model, bad health status or low health-related quality of life. Although it remains unclear which is the cause and which is the effect of this phenomenon, it appears crucial to further investigate this group in order to offer a tailored treatment setting and improve outcome for these patients.

We conclude that in the urban area of Zurich a well-working system offers high-quality healthcare with regard to somatic treatment as well as psychosocial care to persons living with HIV. It allows patients to choose a health-care model according to their preferences (e.g. concerning the physicians treating style) and their individual needs (e.g. psychosocial support) [27–31]. On condition that the general practitioners have a certain level of experience, continuously keep up with the recent developments in HIV medicine and are embedded in a support system that provides specialists' knowledge, this model efficiently and effectively utilizes existing teams of specialty and primary healthcare professionals relying on their mutual co-operation. It can serve as a model for providing healthcare in rural and other areas where local providers have only limited HIV expertise and patients want to avoid having to commute long distances for their medical care [5].

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Appendix

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